VDOT
Virginia Department of Transportation

Rapid Repair Techniques Workshop

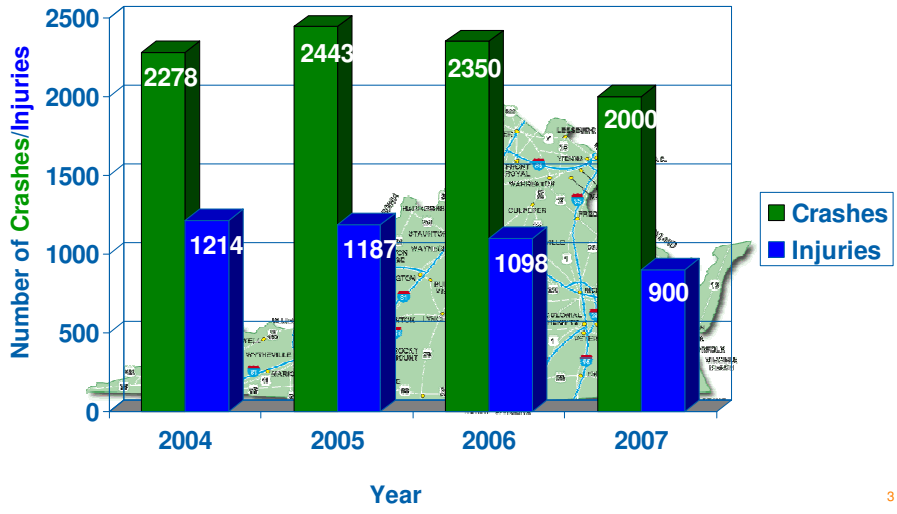
Work Zone Safety
Work Zone Traffic Impact Analysis
Work Zone Barriers

Paul Kelley
Work Zone Safety Coordinator
May 21, 2009

VDOT

Work Zone Safety

Work Zone Crashes and Injuries on State Maintained Roadways



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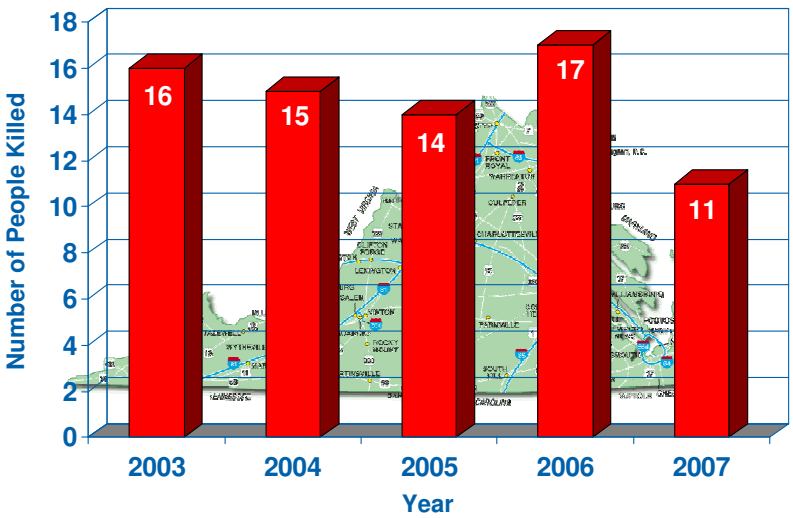
Work Zone Deaths on State Maintained Roadways



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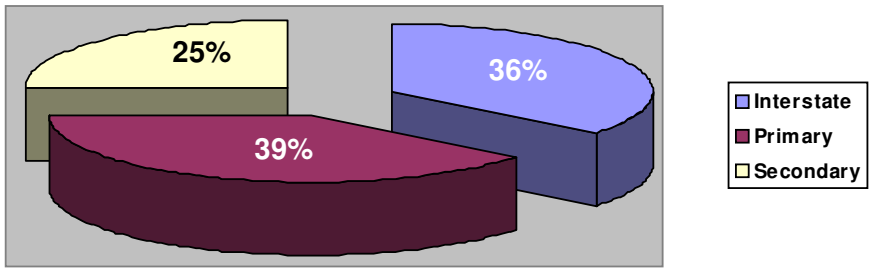
2007 WZ Crash Locations by Roadway



Roadway Type	Number of Crashes
Primaries	787
Limited Access	714
Secondaries	499

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Work Zone Crashes

Top five charges in 2007:

1. Following too closely
2. Reckless driving - exceeding safe speed
3. Failure to maintain control
4. Failure to yield right-of-way
5. Improper lane change

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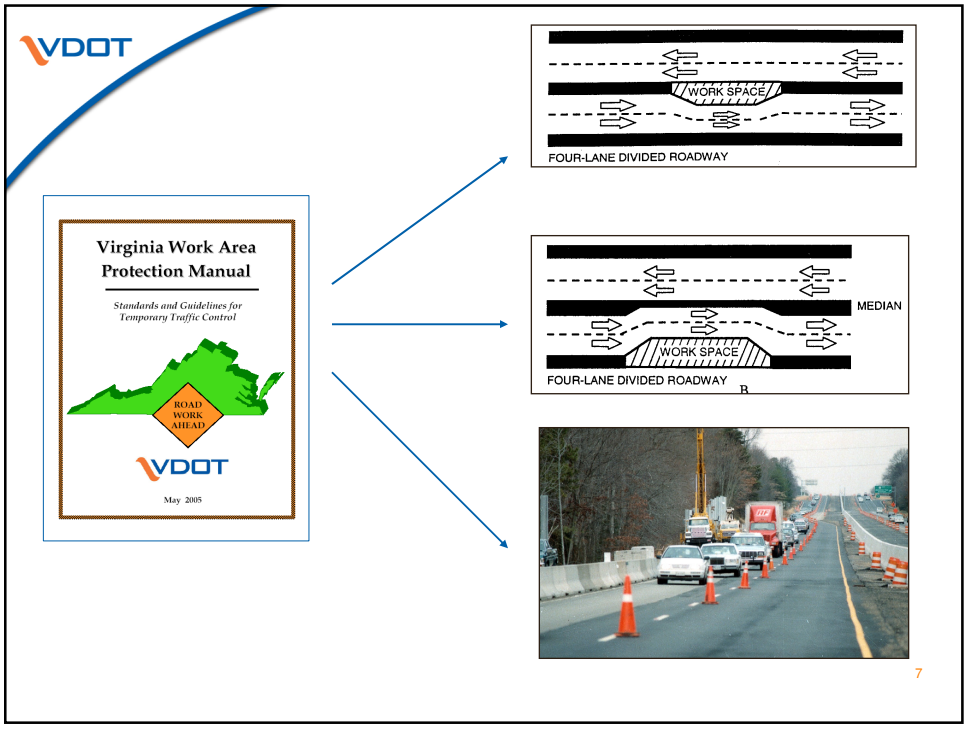
VDOT
Virginia Work Area Protection Manual
Standards and Guidelines for Temporary Traffic Control
ROAD WORK AHEAD
VDOT
May 2005
WORK SPACE
FOUR-LANE DIVIDED ROADWAY
MEDIAN
WORK SPACE
FOUR-LANE DIVIDED ROADWAY
B
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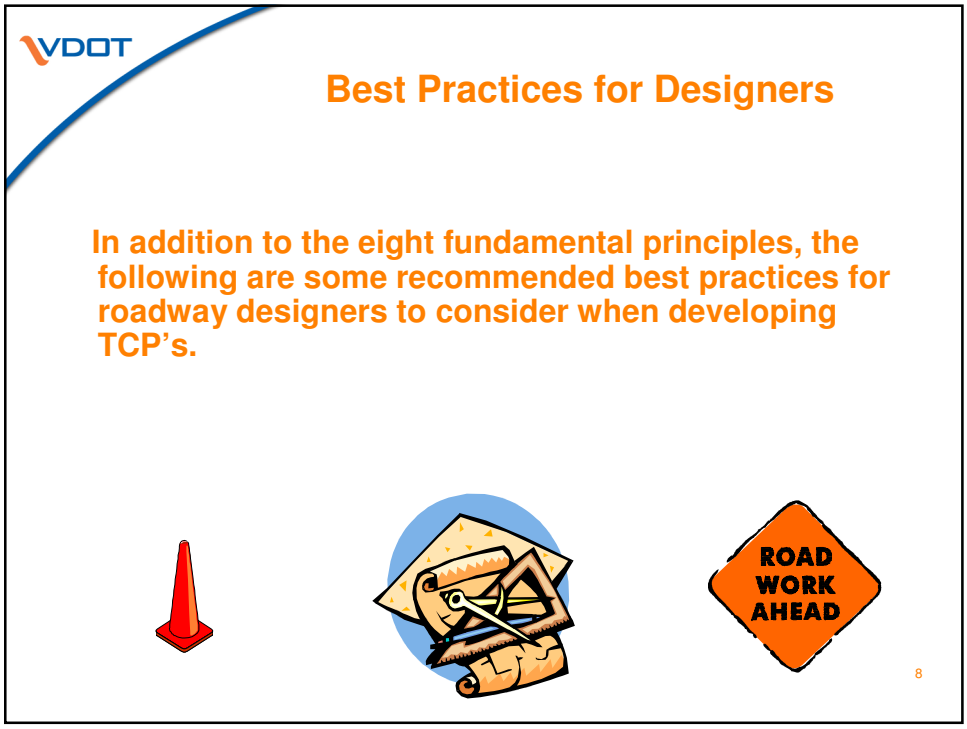
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Best Practices for Designers
In addition to the eight fundamental principles, the following are some recommended best practices for roadway designers to consider when developing TCP's.
ROAD WORK AHEAD
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Best Practices for Designers

Design for actual traffic speeds when possible:

- **Motorist will only reduce travel speeds if they perceive a need to.**
- **Make lane shifts and crossovers as long as possible.**

If existing turn lanes are present, then they should be provided during construction.

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Best Practices for Designers

Look at the "Big Picture":

- **Consider nearby routes and roadway corridors.**
- **Visit the site prior to beginning the design work.**
- **Visit the site once construction has begun – is the design and TCP working?**

Ask the question "Can we close this road to build this project?"

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Work Zone Traffic Impacts

What is Work Zone Traffic Impacts Assessment?

Overview of the Analysis Process

- Assess the work zone impacts and developing appropriate transportation management plans (TMPs) during project development.
- Monitor actual impacts during construction and making adjustments if necessary.
- Conduct performance assessments to track performance to improve work zone policies, procedures and practices.

Work Zone Traffic Impact Considerations

- Safety of Motorists/Pedestrians/Bicyclists and Highway Workers
- Mobility and Accessibility
- Constructability by building projects as effectively and efficiently as possible

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Traffic/Road User Cost Analysis Tools

- VDOT Permitted Lane Closure Hours
- NCHRP Report 581
- Virginia HUB – Highway User Benefit – Cost Analysis Worksheet (Currently Under Development)

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VDOT Regional Permitted Lane Closure Hours

Legend
=Keep Lanes Open

Link ID:				
Traffic Volume	Construction Season		Non-Construction Season	
Hour of the Day	Summer Weekday Volume	Summer Weekend Volume	Winter Weekday Volume	Winter Weekend Volume
0 - 1AM	603	717	456	565
1 - 2AM	484	556	367	448
2 - 3AM	426	500	333	416
3 - 4AM	457	465	365	383
4 - 5AM	651	443	541	353
5 - 6AM	1115	612	937	479
6 - 7AM	1625	915	1505	640
7 - 8AM	2335	1324	2036	931
8 - 9AM	2369	1912	1979	1377
9 - 10AM	2428	2527	1947	1816
10 - 11AM	2661	3047	2121	2167
11 - 12PM	2772	3240	2226	2355
12 - 1PM	2855	3259	2324	2449
1 - 2PM	2979	3254	2434	2488
2 - 3PM	3116	3196	2600	2455
3 - 4PM	3183	3100	2723	2398
4 - 5PM	3222	2925	2754	2249
5 - 6PM	3120	2652	2643	2015
6 - 7PM	2545	2274	2067	1650
7 - 8PM	2081	1876	1613	1328
8 - 9PM	1761	1517	1366	1081
9 - 10PM	1500	1253	1163	896
10 - 11PM	1199	957	909	668
11 - 12PM	897	706	688	499

Season	Construction Weekday	Construction Weekend	Non-Const Weekday	Non-Const Weekend
Hour of the Day	**Closure Times for Mon-Fri**	**Closure Times for Sat-Sun**	**Closure Times for Mon-Fri**	**Closure Times for Sat-Sun**
0 - 1AM	302	358	226	283
1 - 2AM	242	278	183	224
2 - 3AM	213	250	166	208
3 - 4AM	229	233	183	192
4 - 5AM	326	221	270	177
5 - 6AM	558	306	469	239
6 - 7AM	913	457	753	320
7 - 8AM	1168	662	1018	465
8 - 9AM	1180	956	990	689
9 - 10AM	1214	1264	974	908
10 - 11AM	1331	1523	1061	1084
11 - 12PM	1386	1620	1113	1178
12 - 1PM	1427	1629	1162	1225
1 - 2PM	1490	1627	1217	1244
2 - 3PM	1558	1598	1300	1226
3 - 4PM	1592	1550	1362	1199
4 - 5PM	1611	1463	1377	1125
5 - 6PM	1560	1326	1321	1008
6 - 7PM	1272	1137	1033	825
7 - 8PM	1040	938	807	664
8 - 9PM	881	759	678	541
9 - 10PM	750	626	581	448
10 - 11PM	600	479	455	334
11 - 12PM	448	353	344	250

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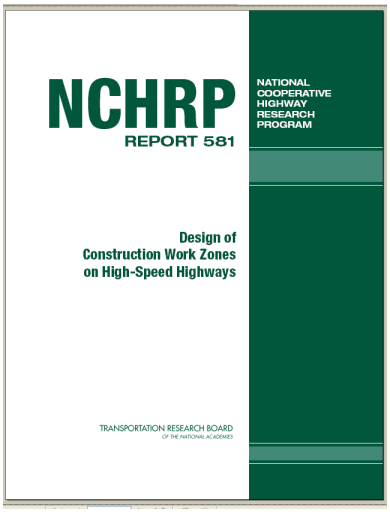
Miscellaneous Work Zone Traffic Analysis Tools



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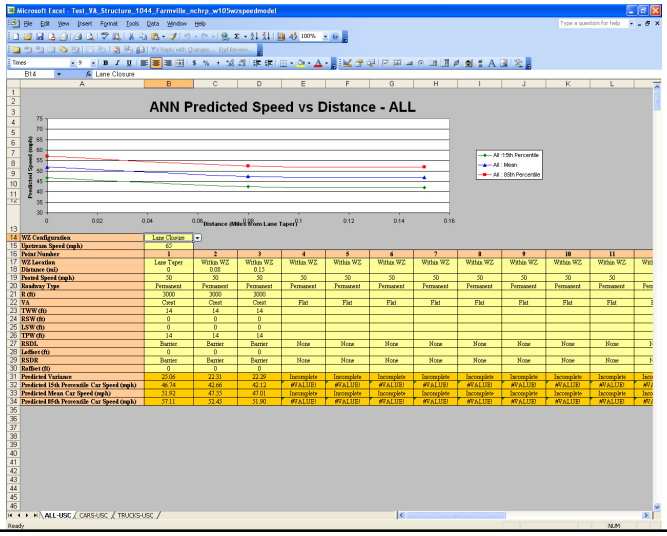
Miscellaneous Work Zone Traffic Analysis Tools

Artificial Neural Network (ANN)

www.trb.org/news/blurb_detail.asp?id=7363



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Traffic Barriers

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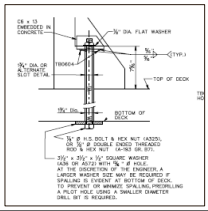
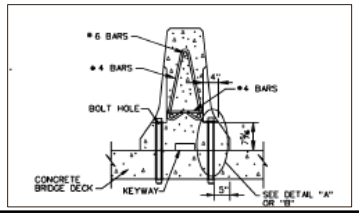
Barrier Installation

- Barriers have a deflection zone ranging from 2' to 3' up to over 8', depending on the design of barrier service.
- L& D Division has issued the following guidelines (IIM-LD-93.14) regarding this:

  Trenching operations 4' deep or greater within 2' of the backside of the barrier shall be anchored.





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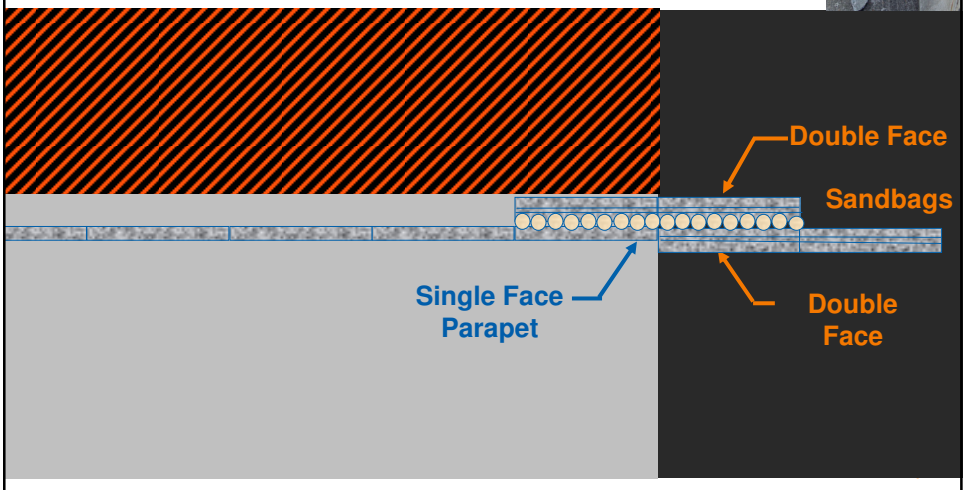
Lateral Support "Method B" Detail



Selecting Barriers, Barricades and Channelizing Devices

Energy Absorption's Vulcan Portable Barrier

- Temporary Steel Barrier – Meets NCHRP 350 TL-3 criteria
- Deflection 3" (anchored) to 6' (free standing)
- Portable using one truck in lengths up 525'

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Blunt End Protection

Approved end treatments

- Type I (Quadguard, ADIEM, etc.)
- Type II (Sand Barrels)

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Questions

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